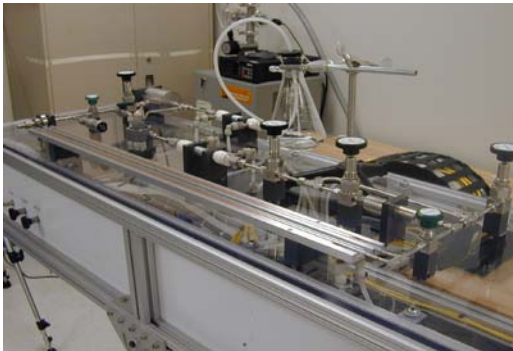


Porous Foam Based Wick Structures For Loop Heat Pipes

As part of an effort to identify cost efficient fabrication techniques for Loop Heat Pipe (LHP) construction, NASA Goddard Space Flight Center's Cryogenics and Fluids Branch collaborated with the U.S. Naval Academy's Aerospace Engineering Department in Spring 2012 to investigate the viability of carbon foam as a wick material within LHPs. The carbon foam was manufactured by ERG Aerospace and machined to geometric specifications at the U.S. Naval Academy's Materials, Mechanics and Structures Machine Shop. NASA GSFC's Fractal Loop Heat Pipe (developed under SBIR contract #NAS5-02112) was used as the validation LHP platform. In a horizontal orientation, the FLHP system demonstrated a heat flux of 75 W/cm^2 with deionized water as the working fluid. Also, no failed start-ups occurred during the 6 week performance testing period. The success of this study validated that foam can be used as a wick structure. Furthermore, given the COTS status of foam materials this study is one more step towards development of a "low cost LHP".



(a) Fractal Loop Heat Pipe



(b) Primary Wick

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